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(71) Applicant
Standard Telephones and Cables Public Limited Company,
(United Kingdom),
190 Strand, London WC2R 1DU

(72) Inventor
Robert Walter Alister Scarr

(74) Agent and/or Address for Service
S. R. Capsey,
STC Patent Department, Edinburgh Way, Harlow,
Essex CM20 2SH

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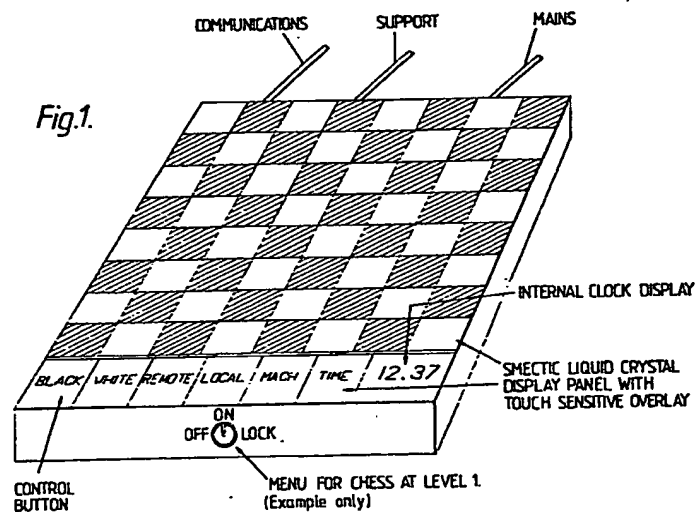
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GB A 2055234 US 4082285
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GB 1488654 US 4019745
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(58) Field of search
A6H

(54) Electronic board games

(57) A display device for use for electronic board games uses a smectic liquid crystal display device, which is flat, thin, and uses low power, with a touch-sensitive overlay for inserting moves into the system. The device is processor controlled, and can be used as an opponent when the device has a game-playing cassette plugged in.



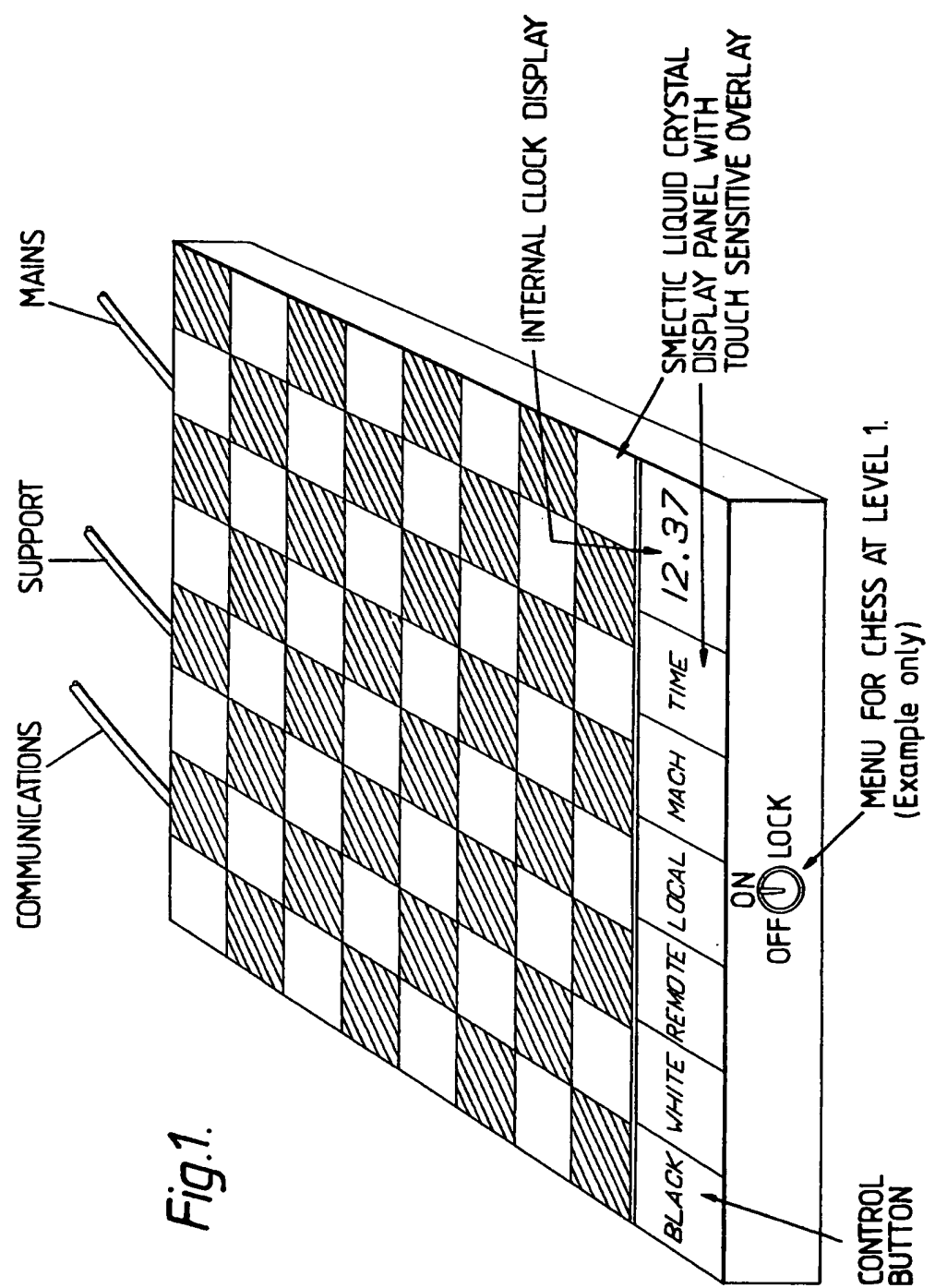
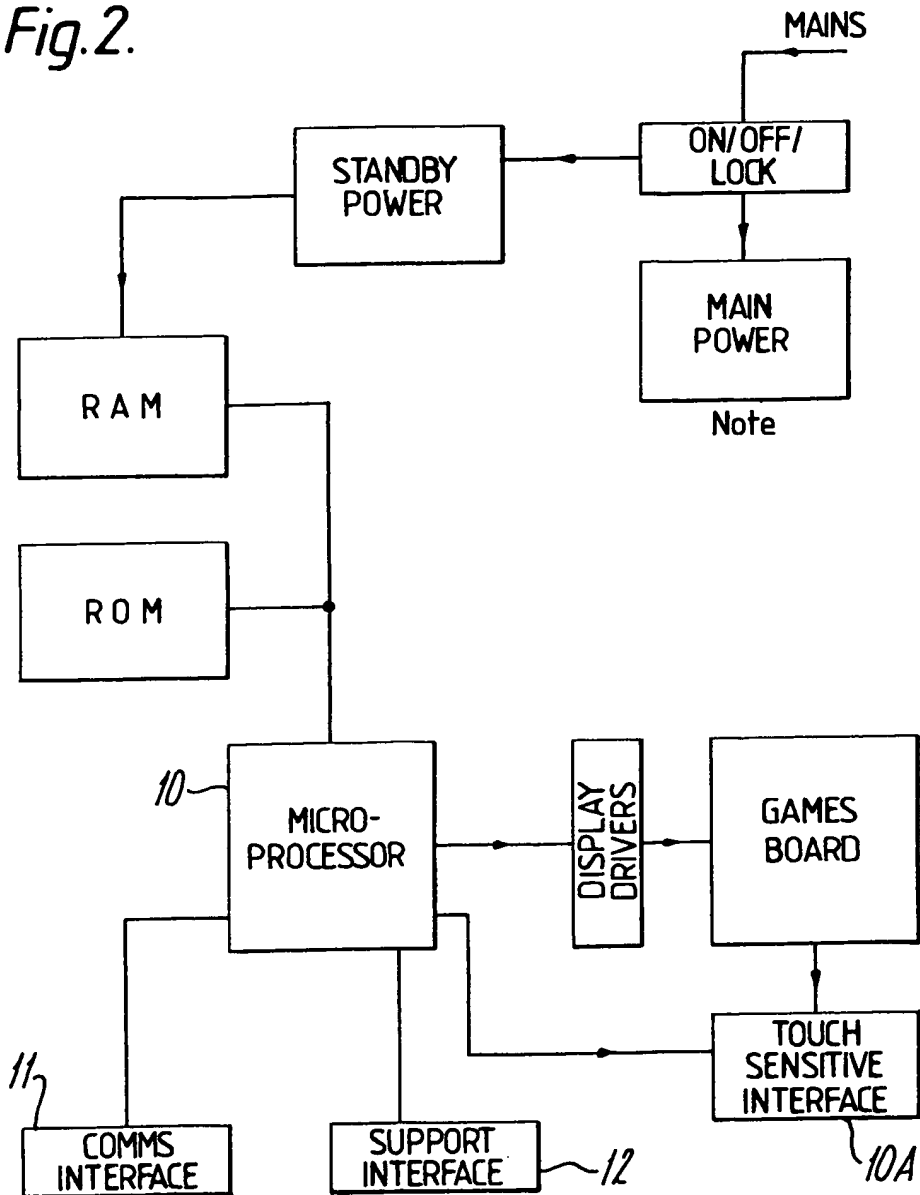


Fig. 2.



Note:-POWER CONNECTED TO ALL UNITS BUT NOT SHOWN.

SPECIFICATION

Electronic games

5 The present invention relates to electronic display arrangements for board games.

According to the invention there is provided an electronic display arrangement for board games, which includes an electronic display device of the
10 flat panel type, means for setting up a display on the display device appropriate to the game to be played, and touch sensitive means associated with the display device for conveying moves to be played to control means associated with the display device.

15 An embodiment of the invention will now be described with reference to the accompanying drawings, in which Fig. 1 is an illustration of a games board embodying the invention, and Fig. 2 is a
20 block diagram of an electronic support system for board games, which system also embodies the invention.

As will be seen the form of display chosen is a smectic flat panel display, since such displays can
25 be made in a size suitable for board games such as chess, draughts, halma and go. They are inherently thin, and the associated electronics can be mounted behind the display panel giving an overall depth of the 1/2" to 2" order. A display once
30 written is permanent (until changed by the control circuitry), which is an advantage as it gives a flicker-free output at zero power consumption from a reflective panel. Such games can be played between two players, or, particularly for chess, one
35 player against a machine. In the latter case the microprocessor containing the games programme is located behind the display, with the rest of the drive electronics.

Two-dimensional representation of the pieces on
40 the board is needed, and conventions already exist in some cases for these because newspapers publish chess and draughts puzzles, usually in two-dimensional format. Representation of a "black" piece on a "black" square is achieved by representing the black square as "grey" (e.g. by cross-hatching). Individual pixels in a smectic display are
45 black or white, but grey is simulated by setting some of the pixels to black in a "black" square, either in a pattern or pseudo-randomly. Newspapers use an analogous technique to represent the black chess board squares. A black piece on a
50 black square is represented by setting to black remanent white pixels to form the desired outline or shape.

55 The embodiments described below are most relevant when there are two players at locations remote from each other, or when one player plays a machine. Two players at the same location have less need of an electronically supported solution though it could be made to have the value of storing the condition of an adjourned game in a secure manner and aiding analysis afterwards. Also once the facility is provided, it would be an unnecessary restriction to prevent two local players from using
60 it.

Board games of the type mentioned above are relatively slow moving, so there is no real time problem in updating the display to keep pace with the players' moves. Games of the space invader type need high refresh rates which a smectic display at its current speed is not well suited to provide. Further they demand colour which smectic display technology is currently unable to provide. Both these factors could change with further developments. Further, other forms of flat panel displays exist. The permanent memory feature of a smectic display panel is not of much advantage in such an application, but the relatively large area achievable could be. Currently large area space invader type displays use cathode ray tubes, which occupy much more volume than a smectic display of the same area.

The board, Fig. 1, consists of a smectic display panel with a touch sensitive overlay. A strip along one edge of the panel is the control area. The overlay in the control area is used in the performance of control operations, and works in what in display terms is called a menu mode. On switch-on the user is presented with a display consisting of buttons formed by areas of the display in which the main games choices (e.g. chess, draughts, halma, etc. are identified. On touching the region for say chess, the 64 square board appears with the pieces and pawns set up as for the game, so that the button labels change to indicate the chess options available (e.g. playing against a remote player, degrees of difficulty of machine opponent, choice of black or white pieces, etc.). To move a piece the player touches the square the piece or pawn currently occupies, and then touches the square to which he/she want to move it. The electronics can contain a clock which can be preprogrammed using a menu selection procedure to provide time (a digital display in one corner of the board) and time
85 outs to provide a warning when a player's time is up. The warning is visual and/or audible. It is also possible where, as in chess and draughts, the game is played against the clock for a suitable clock system to be provided.

100 The front edge of the board contains a key slot 1 for a key used to turn the game on and off, the key end slot also having a freeze position which locks the board for an adjourned game:

The back of the game contains optional socket(s)
115 for:

(a) A communications interface for use when two players using compatible boards play each other remotely.

(b) A programme interface for loading from external cassette or microprocessor new games or variants on the basic games. We assume that a basic set of games is in-built into the basic starting module.

(c) An interface for dumping moves for later analysis, which may physically be the same as (b). We assume here that the moves in a chess game for example could be stored externally in a personal computer's memory and replayed later.

(d) A mains supply socket. Power supplies are
130 external mains with options of battery back up

keep the memory alive when mains is disconnected and/or batteries to power the equipment in the absence of mains. In the latter case the equipment goes into a "sleep" state between moves to conserve power.

Figure 2 shows a block schematic of the internal electronics. A microprocessor 10 is the control element, and it has ROM (Read Only Memory) for the inbuilt games, the control procedure programmes, and display graphics. It has RAM (Random Access read/write Memory) for the working variables of a game, and for storing additional games loaded from an external source. The display panel has associated with it display drivers and a touch sensitive overlay 10A. An interface from the touch sensitive overlay is scanned by or interrupts the microprocessor and co-ordinate information is passed to the microprocessor, which passes co-ordinate information to the display drivers so that the requisite patterns can be displayed.

A communications interface 11 is provided so that moves on the local board can be passed to a remote board, and moves from the remote board can be passed to a local board. Facilities are provided to pass the total board state from one board to the other periodically, so that problems due to loss or corruption of information can be recognised. Information is passed in packet form using the ISDN and/or the packet switching network, as this is a economic arrangement than keeping a voice circuit open for the duration of the game. Voice communication using conventional telephony might be needed at the start of the game, and ISDN offers voice/data facilities well suited to such a requirement.

The support interface 12 provides input from external games sources and output to dump facilities for subsequent analysis.

Associated with the power supplies is the circuitry needed to put the equipment into the "sleep" state when it is battery powered, and the standby power supply to keep the RAM alive when a game is adjourned and the mains is disconnected or fails.

CLAIMS

1. An electronic display arrangement for board games, which includes an electronic display device of the flat panel type, means for setting up a display on the display device appropriate to the game to be played, and touch sensitive means associated with the display device for conveying moves to be played to control means associated with the display device.

2. An arrangement as claimed in claim 1, in which the arrangement includes a processor with a programme appropriate to the game to be applied, information relating to moves played by a user via the touch sensitive means being conveyed to the processor, and means under control of the processor to indicate moves to be played by the processor with its programme.

3. An arrangement as claimed in claim 1 or 2, and in which the display device is a smectic liquid

crystal device.

4. An electronic display arrangement for board games, which includes a smectic liquid crystal display device of the flat panel type, means for setting up on the display device a display appropriate to the game to be played, touch sensitive means associated with the display device for conveying moves to be played to control means associated with the display device, and a processor programmed in a manner appropriate to the game to be played included in said control means, the arrangement being such that information relating to moves played by a user is conveyed from the touch-sensitive means to the processor, and that information relating to moves determined by the processor's programme are conveyed to the display.

5. An electronic display arrangement for board games, substantially as described with reference to the accompanying drawings.

Amendments to the claims have been filed, and have the following effect:-

*(b) New or textually amended claims have been filed as follows:-

6. An electronic display arrangement for board games, which includes a smectic liquid crystal display device of the flat panel type, wherein on switching the arrangement on the display device displays a plurality of areas each appropriate to one of a number of games available, wherein the display device has a touch sensitive overlay, such that when the user touches the area of the overlay appropriate to the game to be used control circuitry causes the setting up on the display device of a display appropriate to that one of said games to be used, wherein thereafter the touch-sensitive means of the display device is used for conveying information as to moves to be played to the control circuitry associated with the display device, so that those moves are represented on the display device, and further touch sensitive control means associated with but additional to the display device is used for the provision of control functions in respect of the display device.

7. An arrangement as claimed in claim 6, wherein the moves to be played are indicated via the touch-sensitive overlay while the colour to be played by the user is indicated by part of the further touch-sensitive control means.

8. An arrangement as claimed in claim 6 or 7, and wherein for each of the available games there is processor means suitably programmed for an user to play against the machine.

9. An arrangement as claimed in claim 6, 7 or 8, and wherein in response to the operation of the further touch sensitive control means the machine is usable for playing against a remote opponent to which the arrangement is connected over a telecommunication channel.